

# **The Challenge:**

## **Elimination of**

### **unacceptable emissions** of

CO and PM (carbon monoxide and particulate matter) from  
burning wood and other solid biomass fuels for  
household energy, especially in  
low-cost, user-friendly cookstoves.

# Dry biomass can be gasified.

“Woodgas” is defined as the combustible gases that can be created from wood and other dry biomass via heat-related processes of pyrolysis and char gasification.

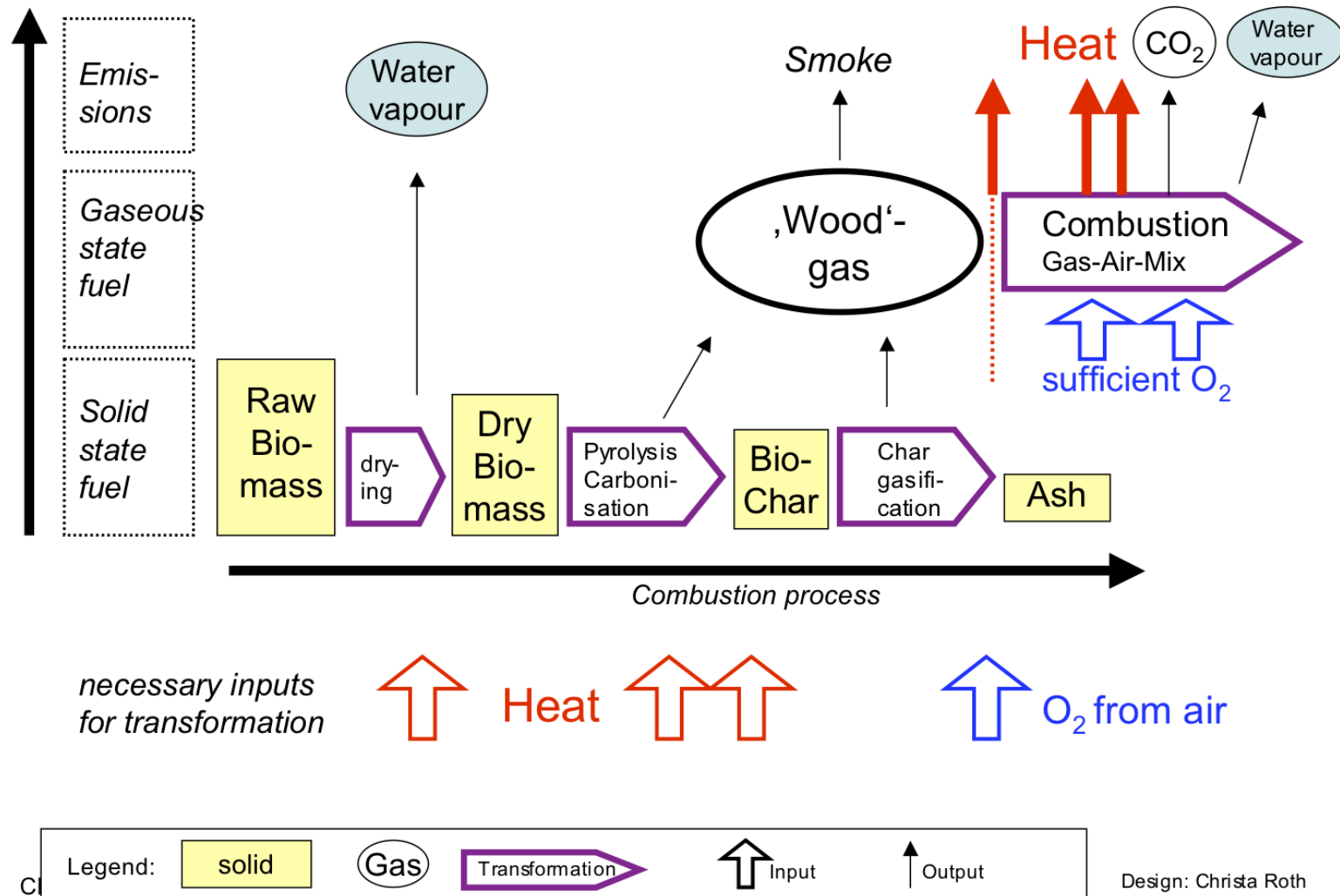
# Wet biomass can be digested.

“Biogas” is commonly reserved for gases from anaerobic digestion of wet biomass.

# Gasifiers:

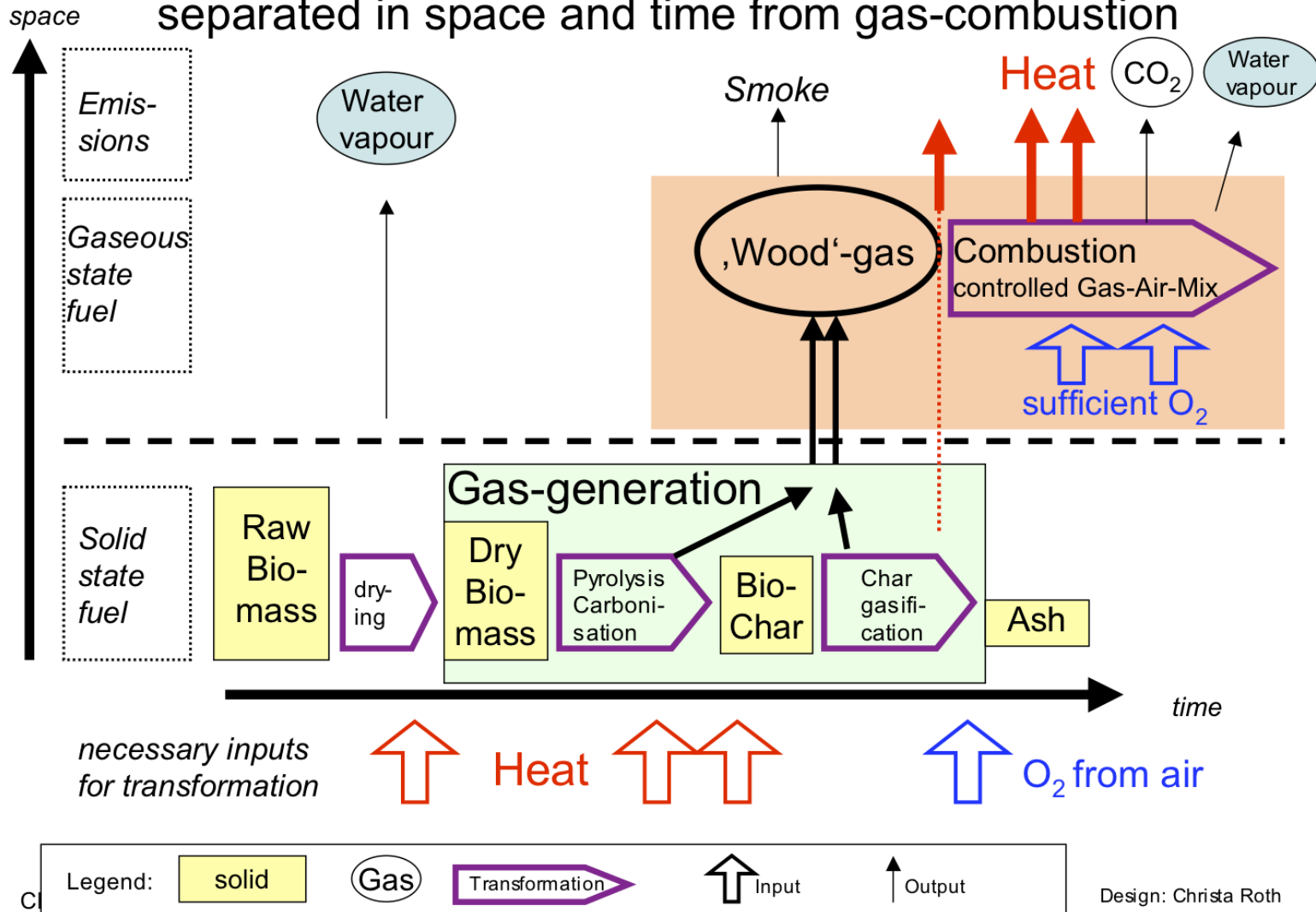
Devices in which the dry biomass is transformed into combustible gases in processes *distinctly and controllably separate in time and location* from the eventual combustion of the gases.

# What happens when biomass is burnt?

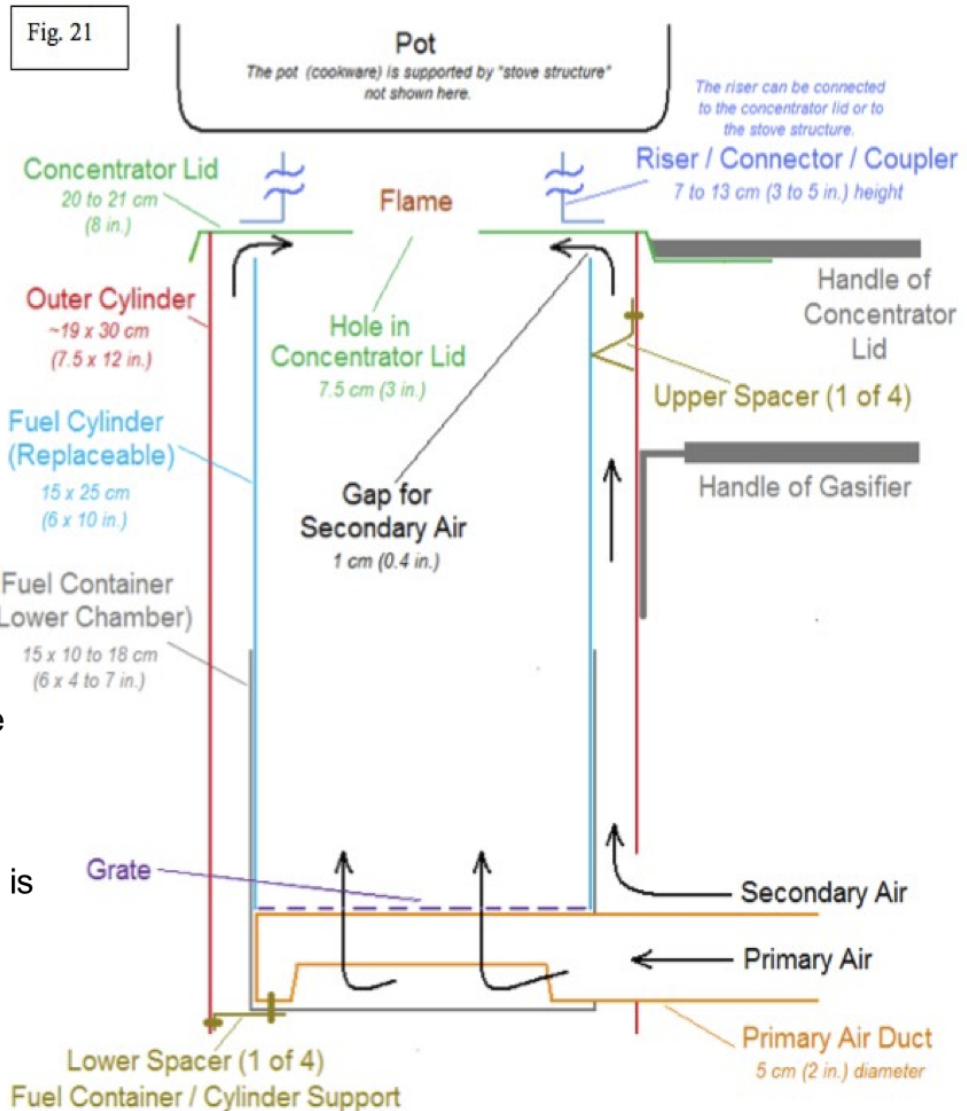


“Pyrolysis is a thermochemical decomposition of organic material at elevated temperatures without the participation of oxygen”

# Biomass gasification: Gas-generation controllably separated in space and time from gas-combustion



# Microgasification



→ Combination of clean cooking and biochar production (e.g. to be used for Terra Preta) at the same time

Dry biomass is transferred into a woodgas (which is burned directly) and charcoal via gasification-pyrolysis, a thermo-chemical process

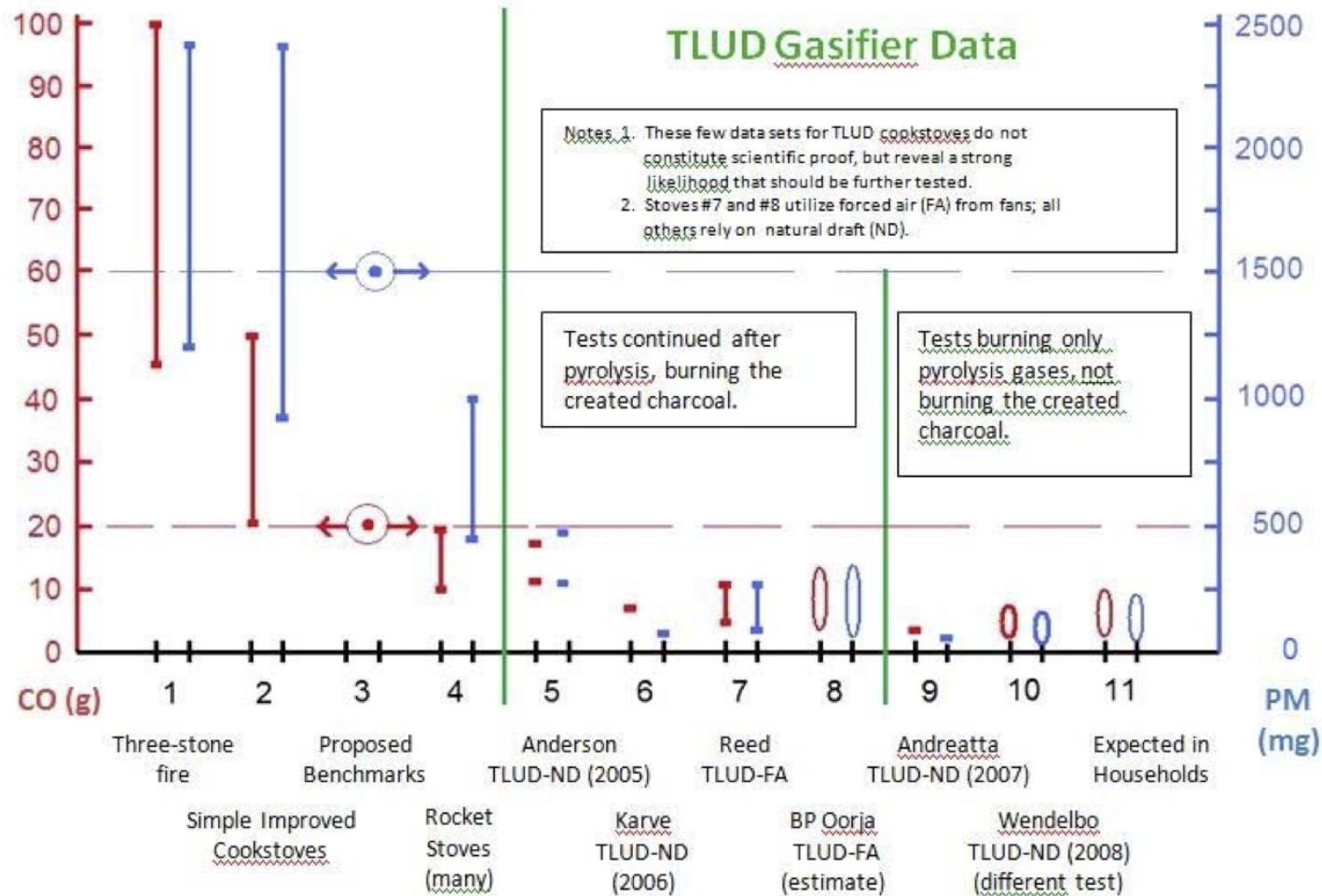
Open source design by Paal Wendelbo

Design by Paul S. Anderson

Quelle: Anderson(2009)

## Emissions of Carbon Monoxide (CO) & Particulate Matter (PM) from TLUD (Top-Lit UpDraft) Gasifiers and Other Cookstoves

(Measured by the Standard 5-Liter Water Boiling Test (WBT))



Prepared by: Anderson, Wendelbo, Reed, and Belonio (2008) for the "Beyond Firewood" Conference.

THANKS for teaching & sharing

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